DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on July 29, 2011 has been entered. Claims 55-62, 64, 65, 67, 71, 83, 89, 91, 104 and 105 have been amended. Claims 1-54, 63, 66, 68-70, 72-82, 84-88, 90, 92-103 and 106 have been canceled. No claims have been added. Accordingly, claims 55-62, 64, 65, 67, 71, 83, 89, 91, 104 and 105 are examined on the merits herewith.

As discussed in the attached Interview Summary, Applicants have preferred to accept some form of the examiner's amendment at a later date, or to amend the claims themselves, as they require time to file an IDS in the instant application.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Drawings and Specification

The corrected drawings and corresponding amendments to the descriptions of the drawings in the specification were received on July 29, 2011. These drawings and amendments are accepted.

Claim Rejections - 35 USC § 112, second paragraph

In view of Applicants' amendments to the claims, the rejections in the previous Office action have been modified to mirror the amended claim set. Different rejections are required for

these claims.

Claims 55-62, 64, 65, 67, 71, 83, 89, 91, 104 and 105 remain rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 55 and 60 are unclear and confusing, because they recite that the microchannel is in communication with the measurement chamber. How are these two parts in communication? What is the nature of the communication? Do Applicants mean that the two parts are connected? Clarification and appropriate correction are required.

Claims 64 and 65 are unclear and confusing, because they recite that the contacting surface comprises a particular diameter. Do Applicants mean that the contacting surface has a particular diameter, e.g., a diameter of less than five microns or one micron? A diameter, although measurable, is not a tangible object. Thus, the contacting surface can have but cannot comprise a certain diameter. Also, the claims are unclear and confusing, because they recite the term "less than about" five microns or one micron. What number is about five microns or about one microns? The claims are indefinite, because they recite a range, the only stated limit of which (an upper limit) is itself an undefined range. What are the upper and lower limits of the range that is about one micron or about five microns? Further, a definite lower limit is needed in the claims, because, as written, the diameter can be zero microns, which is not a physical possibility. Then there would be no contact surface on the nanotip or electrode tip. Clarification and appropriate correction are required.

Claim 67 is unclear and confusing, because it recites that a device for controlling pressure is applied to the microchannel. How is the device applied to the microchannel? The structure is unclear. The specification discloses that fluids are pumped into and out of the measurement chamber, by pumping them through the microchannel in either direction, as

needed. Do Applicants mean that a device that controls fluid pressure is connected to the microchannel for pumping fluids into and through, as well as out of and from, the microchannel? Clarification and appropriate correction are required.

As previously discussed, claim 71 is unclear and confusing, because it recites that the system is "interfaced" to a multi-well plate. It is not clear how the system is "interfaced" to the multi-well plate through an external tubing or capillary. This use of the term "interfaced" is not defined in the specification. The structure in this claim cannot be determined. Do Applicants mean that the measurement chamber is one well in a multi-well plate? Do Applicants mean that one of the measurement chamber or the microchannel is connected to a multi-well plate by a piece of tubing? Clarification and appropriate correction are required.

Claim 83 is unclear and confusing, because it recites that the electrode is in communication with an amplifier. How are these two parts in communication? What is the nature of the communication? Do Applicants mean that the two parts are connected? Also, the claim lacks antecedent basis for the term "electrode," because claim 55 does not recite an electrode. It does, however, recite a nanotip. Clarification and appropriate correction are required.

In their Response, Applicants assert that the amended claims overcome the rejections. In reply, some of the rejections have been overcome, some remain, and some new rejections are required. The draft examiner's amendment attached herewith provides suggestions for amending the claims.

Claim Rejections - 35 USC § 103

In view of Applicants' amendments to the claims, the rejection in the previous Office action is withdrawn.

As discussed in the draft examiner's amendment, attached hereto, Maher et al. (US 2002/0025568 A1) disclose an apparatus for carrying out electrical measurements on cells. The apparatus comprises a substrate comprising an array of measurement chambers (a microtiter plate) that contain cells. The measurement chambers have walls surrounding a base. The apparatus comprises an array of microelectrodes that match the wells in the microtiter plate and that are arranged in a lid or cover. The electrodes may be solid (i.e., have solid tips) or fluid filled (patch clamp electrodes). Patch clamp electrodes have a tip, a housing that defines a lumen and an aperture, and they can be inserted into a cell membrane, which is a lipid-based cell structure. The tip has a contacting surface that has a diameter of about one micron. The electrode is filled with a conducting electrolyte solution (a buffered salt solution). See Figs. 1, 3 and 9 and paragraphs 11, 15, 127, 136, 137, 143, 144 and 160. Hamill et al. ("Improved patch-clamp techniques for high-resolution current recording from cells and cell-free membrane patches," Pflügers Archiv 391:85-100, 1981) provide further disclosure on the structure and use of patch clamp electrodes (see p. 86, second full paragraph and right col.; p. 91, left col.; p. 92, left col.; and Figs. 1, 2A, 6A, 9 and 10 on pp. 86, 87, 91, 93 and 94). The apparatus is part of a computer-controlled system that operates the electrical, mechanical and optical aspects of the apparatus, as it controls the activity of the electrodes, movement of the microtiter plate, spectroscopic readings of the wells in the microtiter plate, and data collection and analysis. The electrodes are compatible with microfluidics equipment (see paragraphs 197, 198, 202 and 205-208). Maher et al. do not disclose that the measurement chambers have microchannels.

He et al. (US 2003/0049862 A1) disclose a microfluidics system, in which the microfluidics plumbing is incorporated into the lid for a standard microtiter plate, thereby providing the measurement chambers with microchannels that are inlets and outlets. The outlets can deliver an aqueous solution to the measurement chambers from a reservoir of that

fluid (continuous fluid delivery). See paragraphs 6-12 and 35-45. The measurement chambers are circular and the microchannels may be radially disposed with outlets in the chambers (see paragraph 39). The system comprises a pressure control device for controlling the positive and negative fluid pressures to the microchannels, which fill and empty the measurement chambers, allowing assays to be performed and the chambers to be washed (see paragraph 49).

The claimed microfluidics system no longer reads on the apparatus of Maher et al. in which the microtiter plate lid has been modified with the microfluidics plumbing of He et al. The claims now recite that the electrically conductive nanotip or electrode tip protrudes from the base or the walls of the measurement chamber, not from the lid or from any other part. Altering the apparatus of Maher et al., in which the microtiter plate lid is modified with the plumbing of He et al., so that the electrodes/nanotips protrude from the base or the walls instead of from the interior of the lid is not a change that is suggested by the cited art. This change is not suggested, because the apparati of Maher et al. and He et al. are designed to be compatible with standard microtiter plates. Thus, in the apparati in the prior art, the electrodes/nanotips must be part of the lid (which is removable for cleaning and loading), not part of the plate.

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROSANNE KOSSON whose telephone number is (571)272-2923. The examiner can normally be reached on Mon., Thurs., Fri., 8:30-6:00, Tues., 8:30-2:00, Wed. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jon Weber can be reached on 571-272-0925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

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/Rosanne Kosson/
Primary Examiner, Art Unit 1657
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